XEROX® PHASER 5500

TONER & DRUM CARTRIDGE REMANUFACTURING INSTRUCTIONS

XEROX® PHASER 5500 TONER CARTRIDGE

XEROX® PHASER 5500 DRUM CARTRIDGE

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REMANUFACTURING THE XEROX PHASER 5500 TONER & DRUM CARTRIDGES

By Mike Josiah and the Technical Staff at UniNet

First released in November 2004, the Xerox Phaser 5500 is based on a 50ppm Xerox engine that runs at 1200 dpi. These machines have a monthly duty cycle of 150,000 pages and have a first page out in under eight seconds. They are heavy duty network machines. I you have a customer with one most likely they will be using quite a few cartridges. These machines are a bit different from most these days in that they use a separate toner tank, and the drum unit also has developer in it.

The toner cartridge 113R00668 is rated for 30,000 pages, and the drum unit 113R00670 is rated for 60,000 pages. Although that is the "rated" specification for the drum cartridge, in reality it is less. Rather than pages, the machine counts drum cycles. There is a maximum number of cycles set at 240,000. The 60,000 page life is based on an average job length of six single-sided pages. The following is taken directly from the Xerox service manual:

"As an example of how job length effects the drum cartridge life count, a continuous print job having a job length of 500 to 1000 pages results in a drum cycle count of 3.2 cycles per page. At 3.2 cycles per page, the drum cartridge life count increases to 75,000 prints. However, if the customer were to print mostly single page jobs, the drum cycle count increases to 7.8 drum cycles per page reducing the drum cartridge life count to 31,250 pages."

The reason for this is that there are start and stop cycles. So what this means is the bigger the print jobs, the longer the drum cartridge will last, the smaller the print jobs, the shorter it will last. Considering the above information, it's highly doubtful anyone will get the stated 60,000 pages.

The stated retail price for the toner cartridge (in U.S. dollars, as of October 2007) is $154.00 and the drum unit is $374.00. So as you can see, there is plenty of room for a nice profit margin.

Current Machines based on the Phaser 5500 engine are the Xerox Phaser 5500B, Xerox Phaser 5500DN, Xerox Phaser 5500DT, Xerox Phaser 5500DX and Xerox Phaser 5500N.

As this machine is a bit different from the norm in how it works (toner and developer), we are covering the cartridge theory here as well. Machine and cartridge troubleshooting are covered at the end of this article.

Before we go into the actual cartridge theory, let's go into what developer is. Developer is actually made up of two components, metal filings (carrier) and toner. When developer is manufactured, the correct toner is mixed with the carrier at a specific percentage. As long as everything is running correctly, developer never actually leaves the cartridge. It picks up the toner from the supply chamber, brings it out to be transferred to the drum, and returns to the developer section where it will pick up more toner and start over again. The mixture of the toner and developer is controlled by a sensor which is located in the toner/developer section of the cartridge. This sensor looks for a specific mixture. When it does not see the proper mix, it will cause the machine to cycle, and bring more toner into the developer section until it does. That is why when in two cartridge systems, a new toner cartridge is installed it will cycle for a while before it goes to ready.

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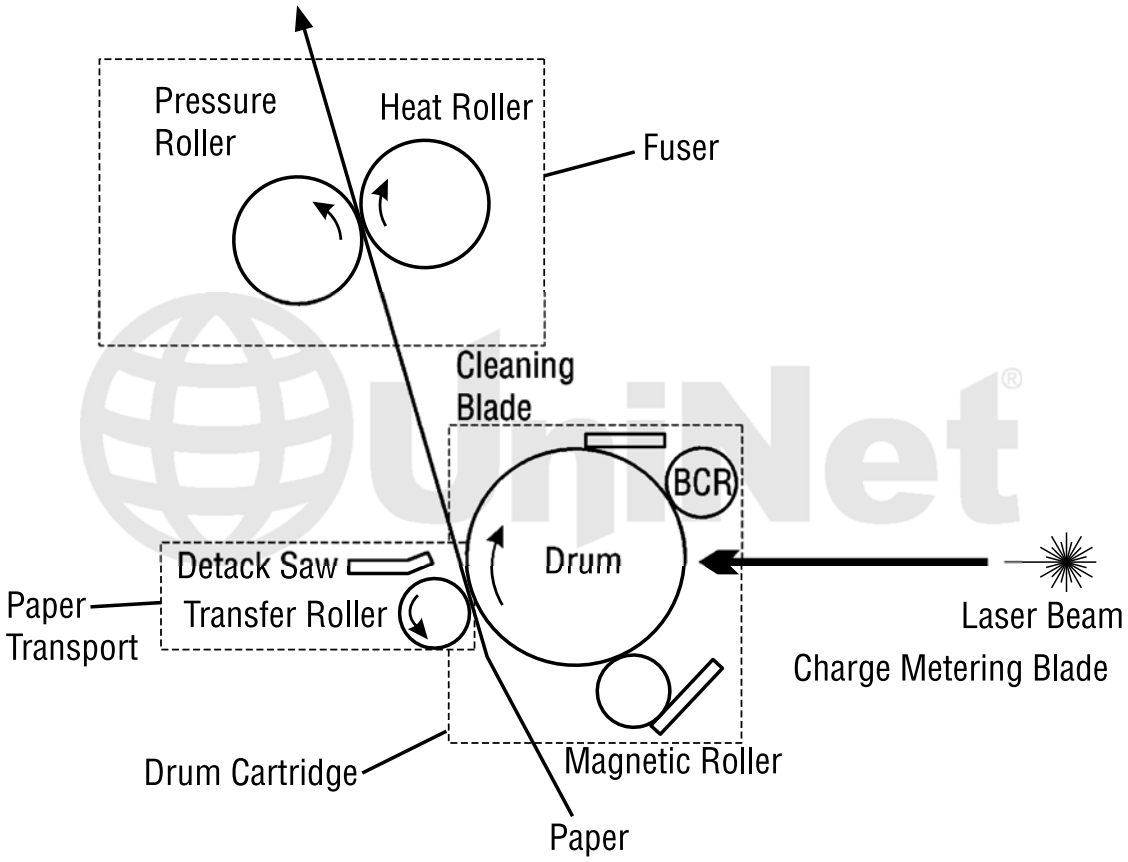
New Carrier Worn Carrier

The best explanation I have ever heard on why developer must be replaced is this: Think of a single metal filing as having the shape of a five-pointed star (it doesn't, but it makes it easier to explain). When the developer is new, the points of the star are sharp, and there is a considerable amount of surface area between the points for the toner to sit. As copies are run, the friction of the toner, other carrier particles, and the magnetic roller will start to wear the points down. As the points get dull, the surface area for the toner to sit in is less. This will cause light prints and if let go long enough, the toner low sensor will never see the correct mixture and will not allow the machine to go to the ready state.

The **Toner Cartridge Printing Process** is best explained as a series of steps or stages. In the **first stage**, the Primary Charge Roller (PCR) places a uniform negative DC Bias voltage on the OPC drum surface. The amount of the negative DC Bias placed on the drum is controlled by the printer's intensity setting. This process is called conditioning.

In the **second stage** (also called the imaging section) the laser beam is fired onto a rotating mirror (called the scanner). This printer actually uses a dual laser beam unit which helps speed up the scanning process. As the mirror rotates, the beam reflects into a set of focusing lens. The beam then strikes the OPCs surface, leaving a latent electrostatic image on the drum.



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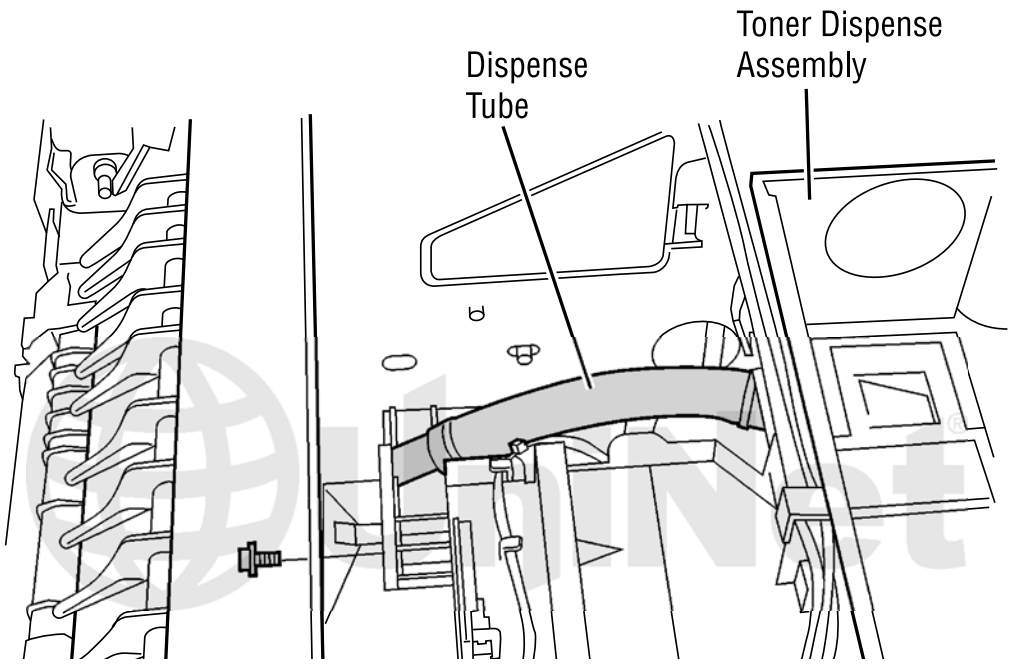

The **third stage** (developing stage) is where the toner image is developed on the drum by the developing section. This is where things change a bit for this system. As the magnetic roller in the drum cartridge turns, it picks up the developer which has a full load of toner on it. The toner is fed from the toner cartridge through an auger/port system. When the developer mixture sensor senses the proper mixture, it sends a signal to stop the agitator and the toner stops being fed into the drum unit. The toner/developer is held to the magnetic roller sleeve by the stationary magnet inside the sleeve, and a negative DC bias voltage supplied by the high voltage power supply. This DC bias voltage is controlled by the printer's intensity setting, and causes either more or less toner to be attracted to the drum. This in turn will either increase or decrease the print density. Both the primary charge roller and magnetic roller DC Bias voltages are controlled by the printer's intensity setting. The amount of toner/developer on the magnetic roller sleeve is controlled by the doctor blade, which uses pressure to keep the amount of toner on the magnetic roller sleeve constant. This blade also causes a static charge to build up on the toner/developer, which helps keep the coating of toner even, and allows easy transfer to the OPC drum (Xerox calls the doctor blade a "charging and metering blade"). As the laser exposed areas of the OPC drum approach the magnetic roller, the toner particles are attracted to the drums surface due to the opposite voltage potentials of the toner, and laser exposed surface of the OPC drum. The charge differential is great enough to attract the toner to the drum, but not great enough to pull the developer. The developer stays on the magnetic roller and returns to the hopper for more toner.

In the **fourth stage** (transfer stage) the toner image is then transferred to the paper as it passes below the drum by the transfer charge roller, which places a positive charge on the back of the paper. This positive charge causes the negatively charged toner on the drum's surface to be attracted to the page. The small diameter of the drum, combined with the stiffness of the paper causes the paper to peel away from the drum.

In the **fifth stage** (separation stage) the paper separates from the drum. The static charge eliminator weakens the attractive forces between the negatively charged drum surface, and the positively charged paper. This prevents toner dropouts onto the paper at low temperatures and humidity and also prevents paper from wrapping around the drum.

In the **sixth stage** (fusing stage) the image is then fused on to the paper by the fuser assembly, which is comprised of the upper and lower fuser rollers. The paper passes between a heated upper fusing roller and a soft lower rubber roller that presses the page up into the upper roller. The upper heated roller then melts the toner into the paper.

In the **seventh stage** (drum cleaning stage) the OPC drum is cleaned. On average, approximately 95% of the toner is transferred to the paper during the print cycle. As the drum rotates during printing, the remaining 5% of the toner that is on the OPC drum is cleaned off the drum by the wiper blade. It is then guided into the waste chamber by the recovery blade, and stored in the waste chamber. Once the print cycle has been completed, the primary charge roller will then place an AC voltage across the drum surface that erases any residual charges left on the drum surface. The OPC drum is now ready to be conditioned by the primary charge roller using the negative DC bias voltage, and start the print cycle again.

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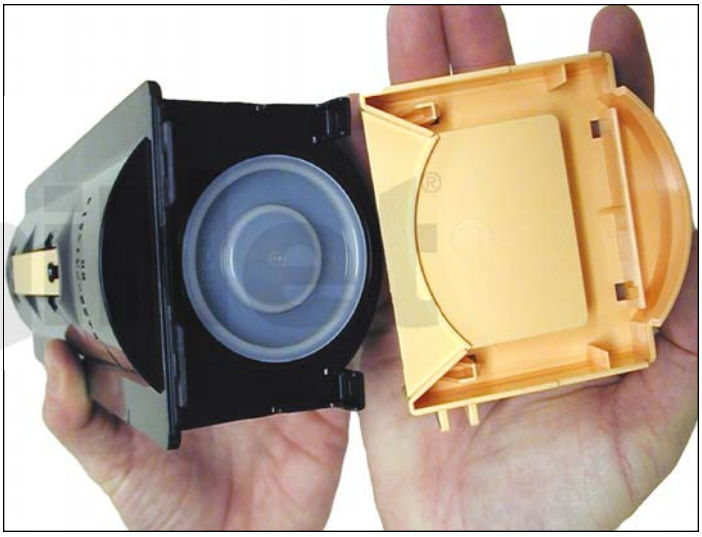
SUPPLIES REQUIRED

1. Xerox Phaser 5500 toner 625g
2. Xerox Phaser 5500 developer (used in OPC cartridge)
3. Xerox Phaser 5500 toner cartridge replacement chip
4. Xerox Phaser 5500 drum cartridge replacement chip
5. Xerox Phaser 5500 OPC drum
6. Xerox Phaser 5500 wiper blade
7. Conductive grease

TOOLS REQUIRED

1. Phillips head screwdriver
2. Small common screwdriver
3. Vacuum approved for toner



REMANUFACTURING THE TONER CARTRIDGE

1. On the beige end cap, locate the four small rectangular holes. In each of these holes is a locking tab. With a small jeweler's screwdriver, press up on the top two tabs to release the top half and press down with the screwdriver to release the bottom half. Remove the end cap.

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2. Remove the fill plug and clean out all remaining toner.

3. Fill with 500g Phaser 5500 toner and replace the fill plug.

4. Install the end cap. Make sure it fully snaps in place.

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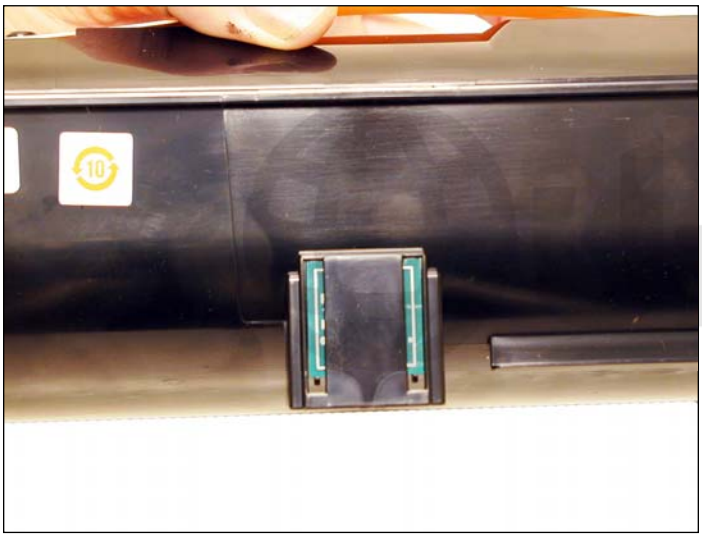

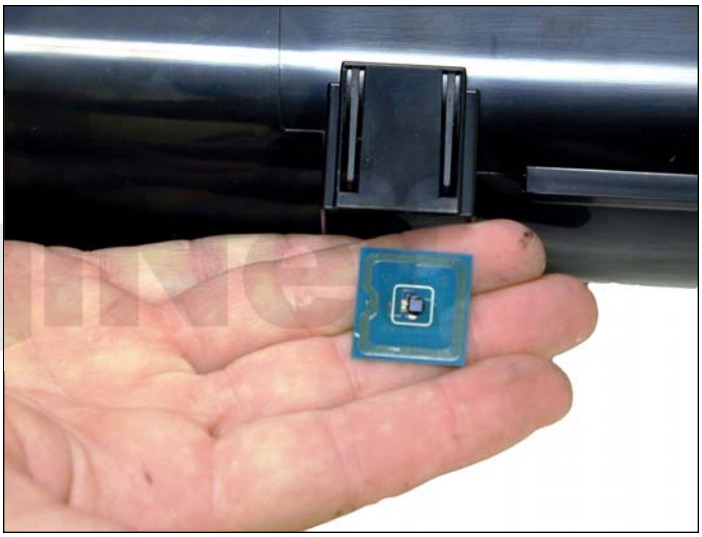

5. Replace the chip by pulling up on the chip cover, and lifting the chip up slightly so it can slide over the two tabs.

REMANUFACTURING THE DRUM CARTRIDGE

1. Remove the two screws located on the handle side end cap. Remove the end cap.

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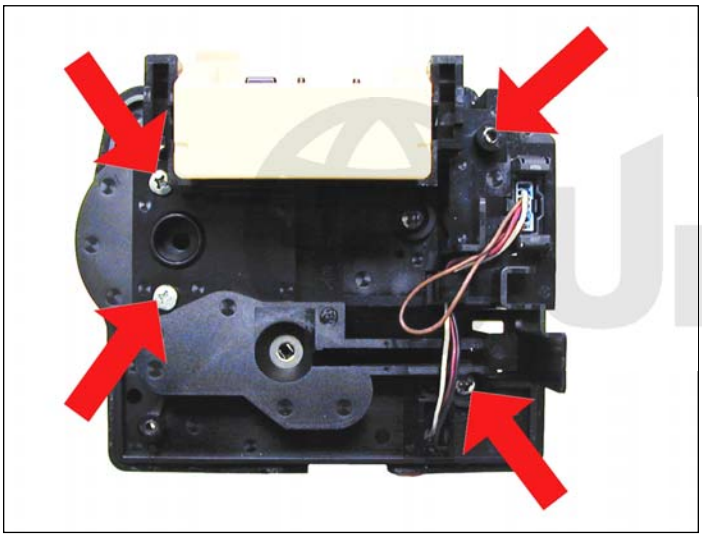

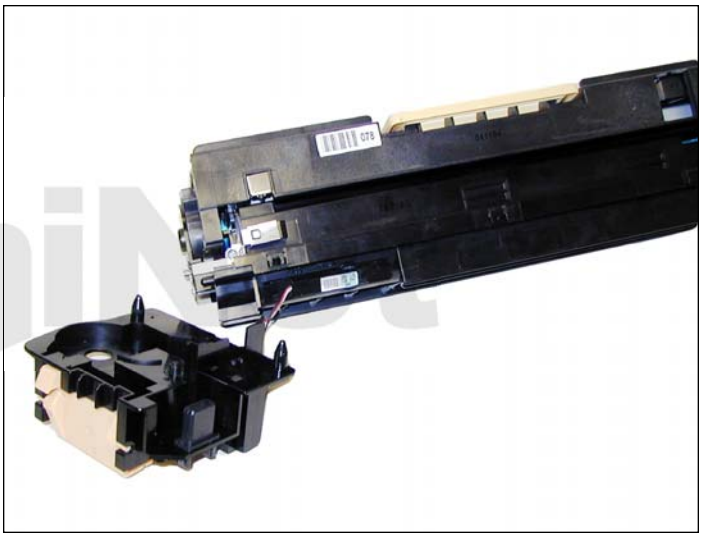

2. Remove the four screws from the inner end cap.

Remove the end cap.

3. Follow the wires from the inner end cap to the sensor. Pry up on the two locking tabs and remove the sensor.

Place a small piece of tape over the sensor hole.

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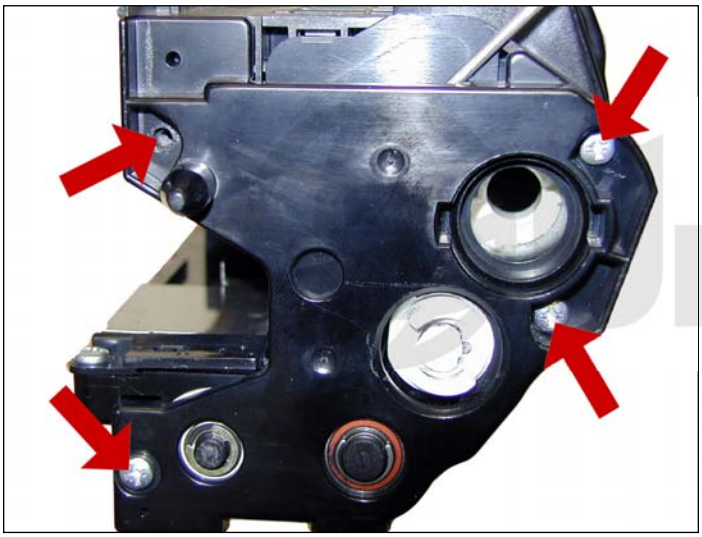
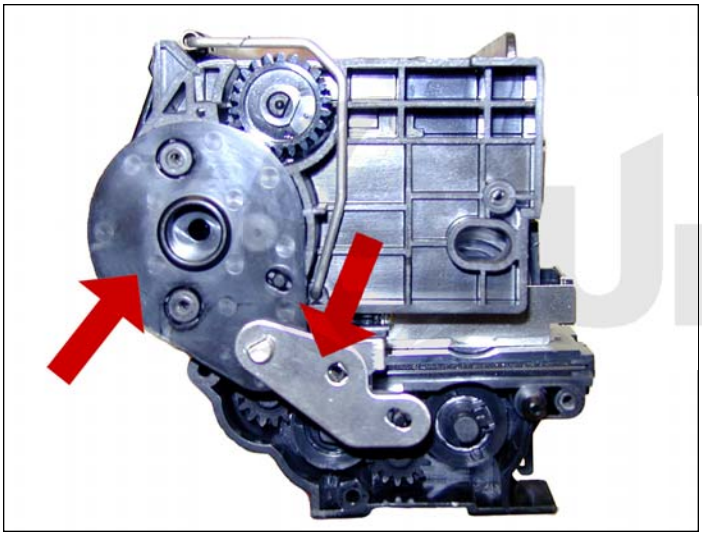
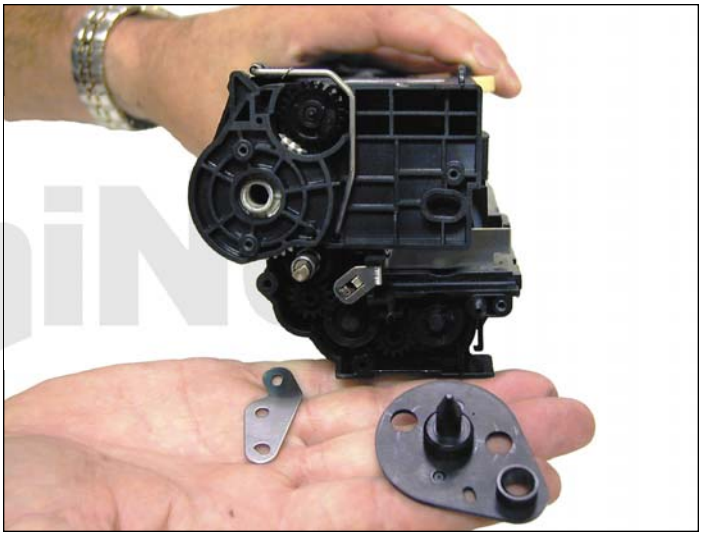


4. On the non gear side, remove the four screws from the end cap.

Remove the end cap.





5. On the large gear side, remove the metal plate and the drum bushing.

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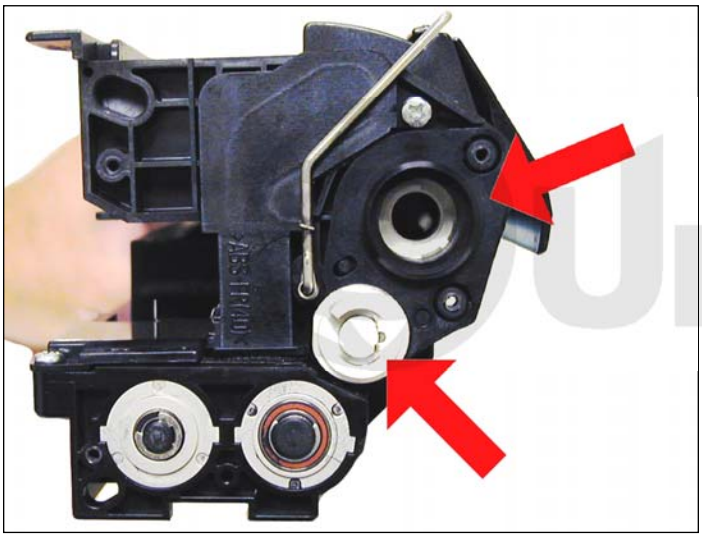

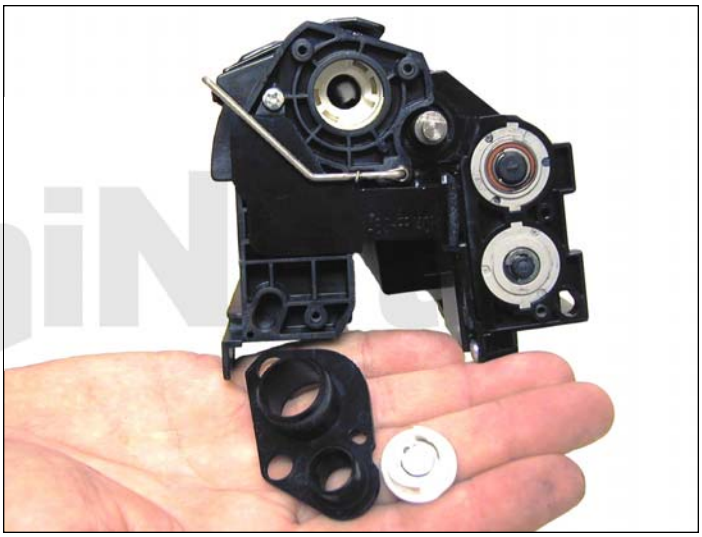

6. On the opposite side (non gear side) pry off the white gear, and the drum bushing.

7. Carefully separate the two halves.

8. Remove the drum, place aside.

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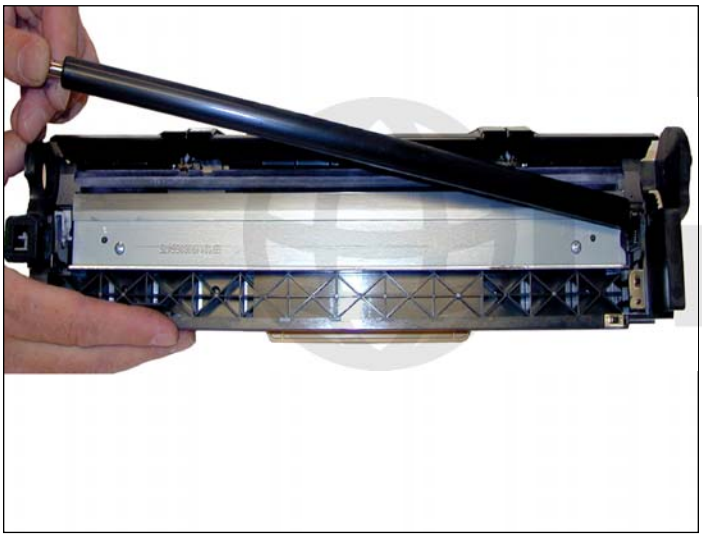
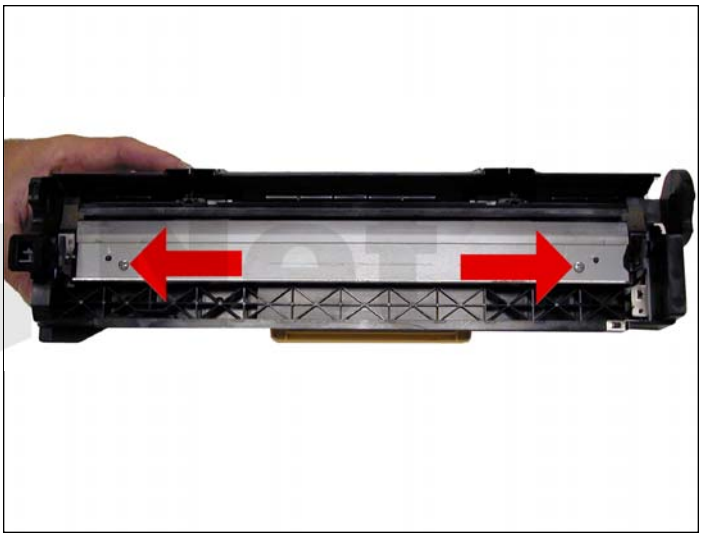
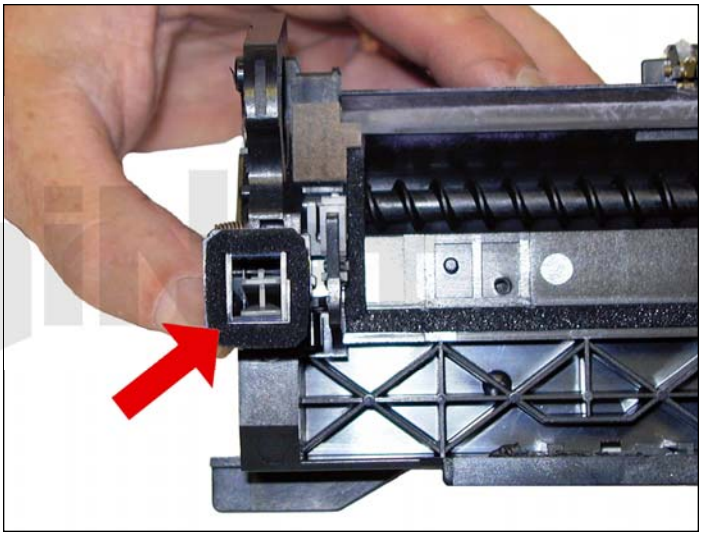


9. Remove the PCR.



10. Remove the two screws from the wiper blade.

Remove the blade.



11. Clean out any toner from the hopper.

Make sure you also clean out the auger post.

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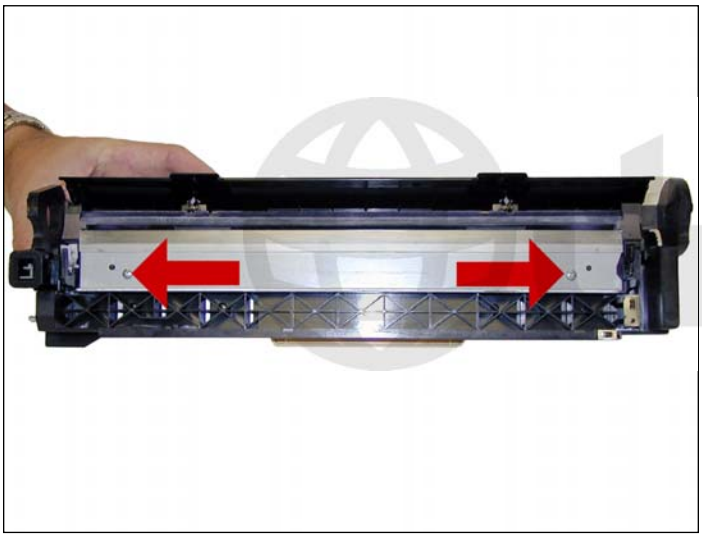
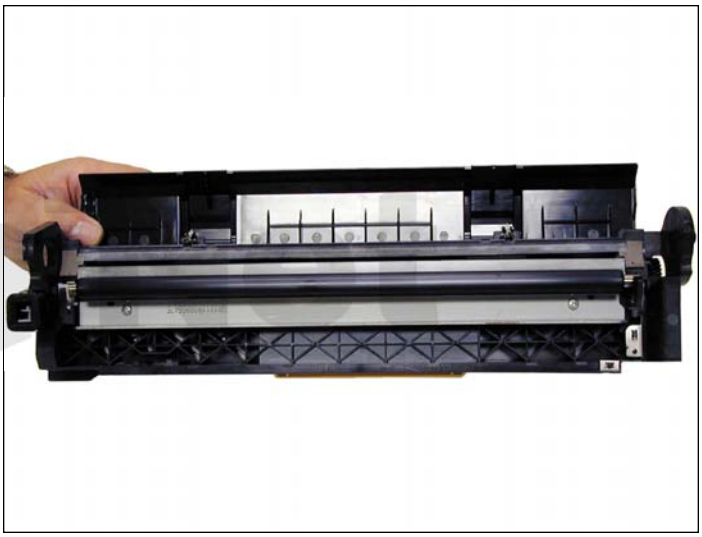
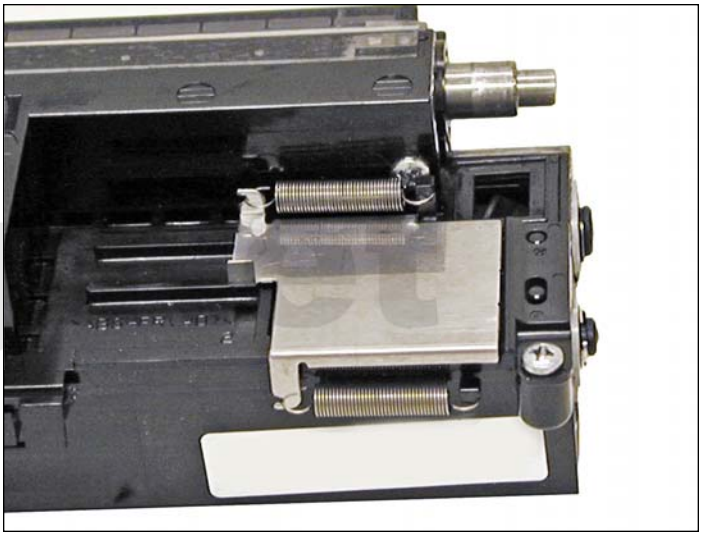


12. Install the new wiper blade and two screws.



13. Clean the PCR with your normal cleaner. Wipe off the old conductive grease from the shaft and replace. Re-install the PCR in the assembly grease side to the black PCR holder.

14. Place the drum in the hopper and carefully place aside.



15. On the developer roller side, remove the two springs from the metal slide cover.

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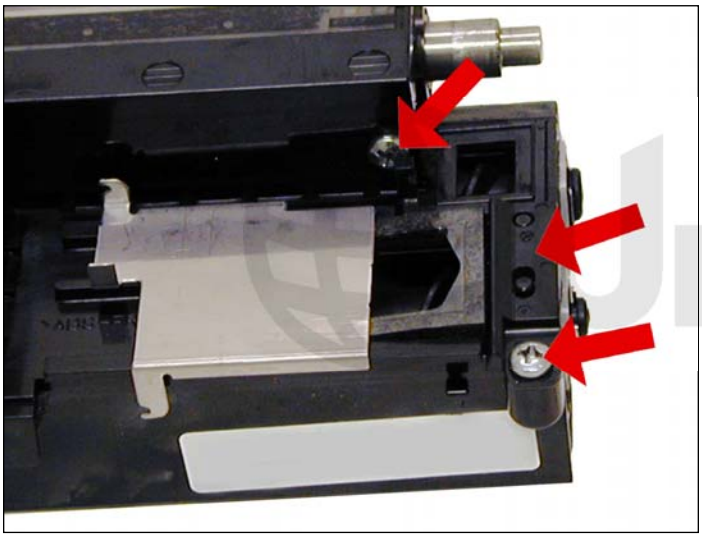
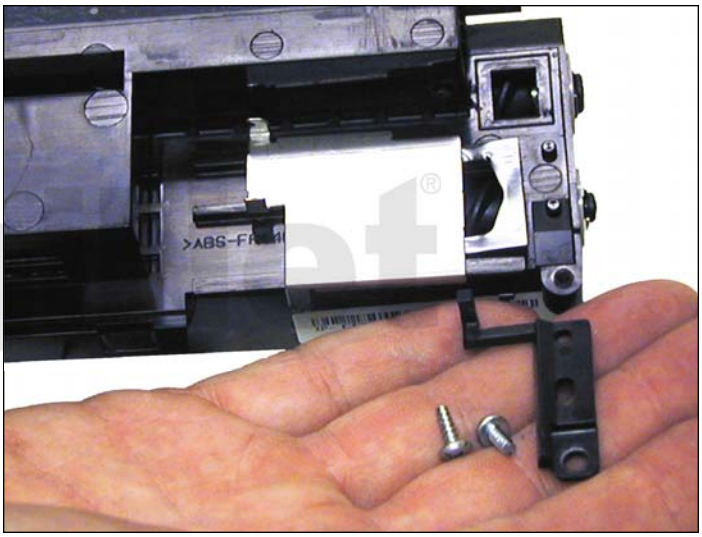
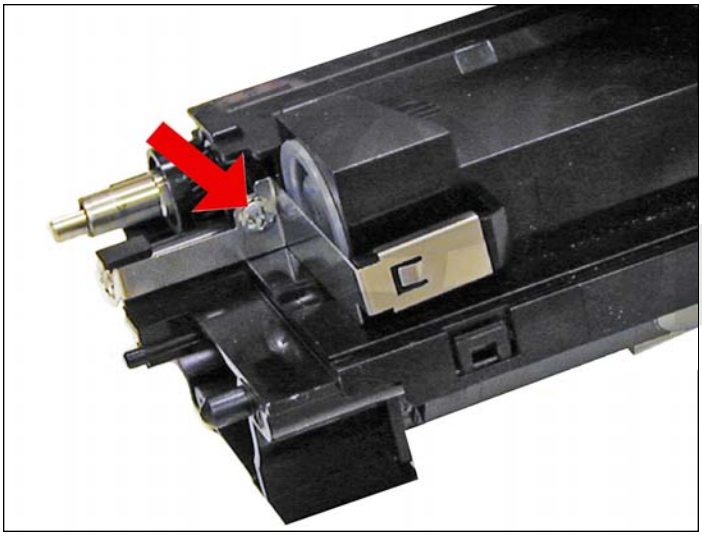
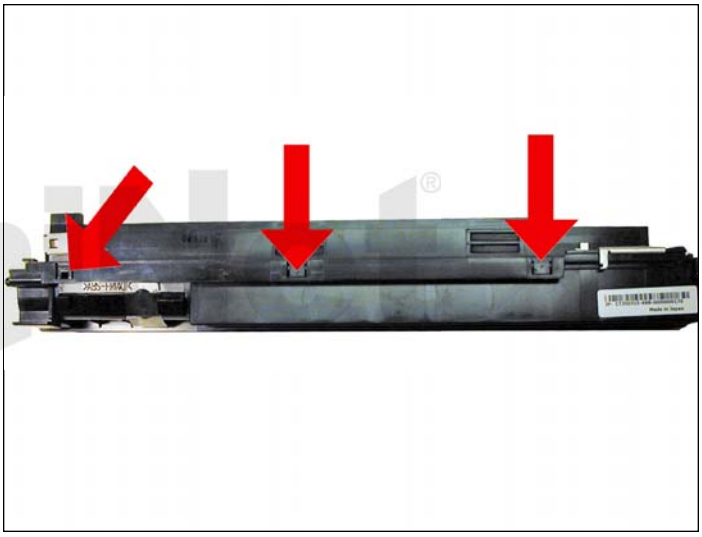




16. Remove the plastic spring arm, and the two screws.



17. Remove the screw from the contact plate on the opposite side of the hopper.



18. Carefully pry up the three plastic tabs on the back edge of the cartridge.

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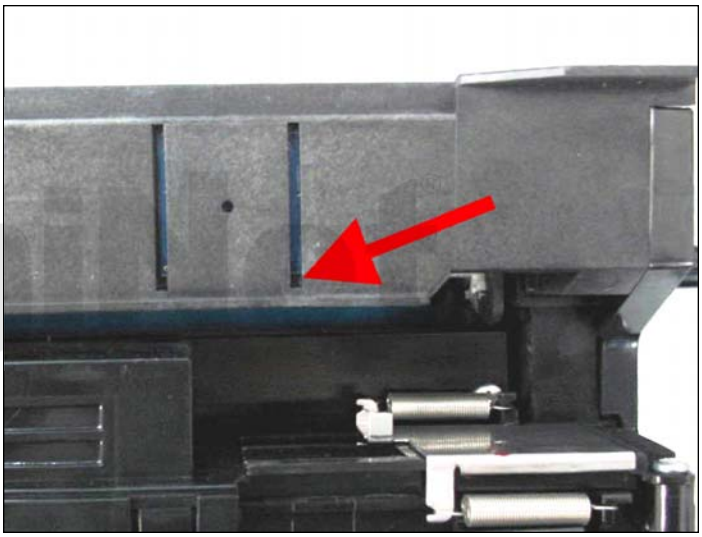
19. Lift off the cover and locate the chip.



20. From the inside of the cover remove and replace the chip.

21. Remove all the old developer from the hopper.

22. Pour in the new developer.

Make sure you cover both augers.

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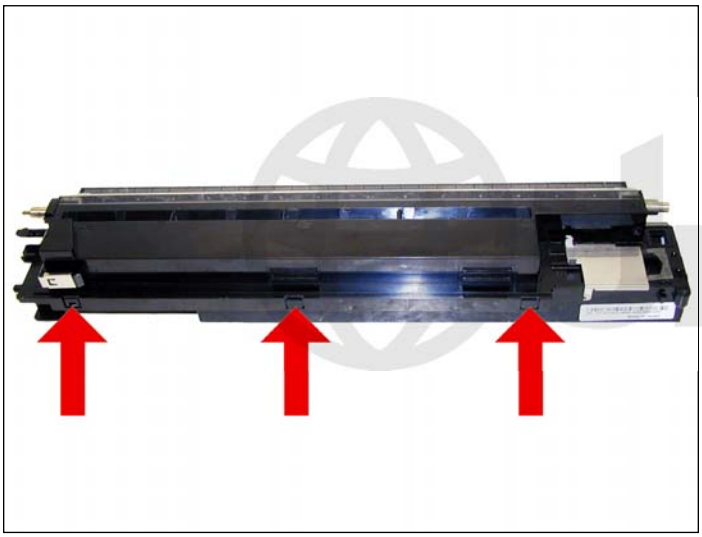
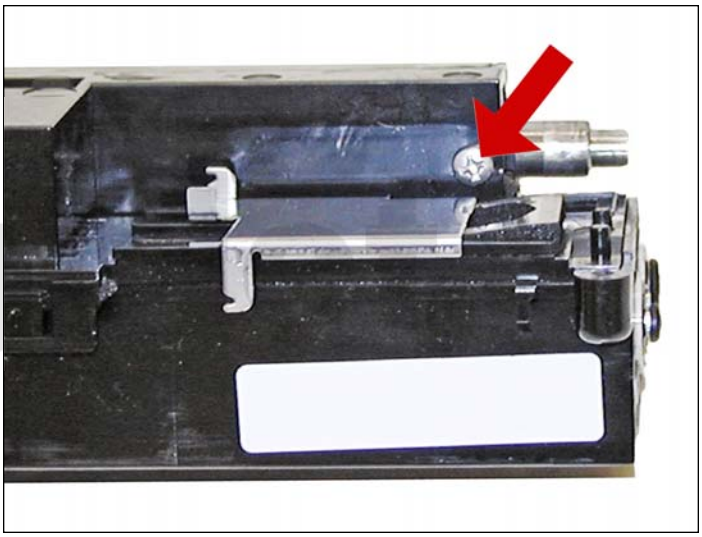
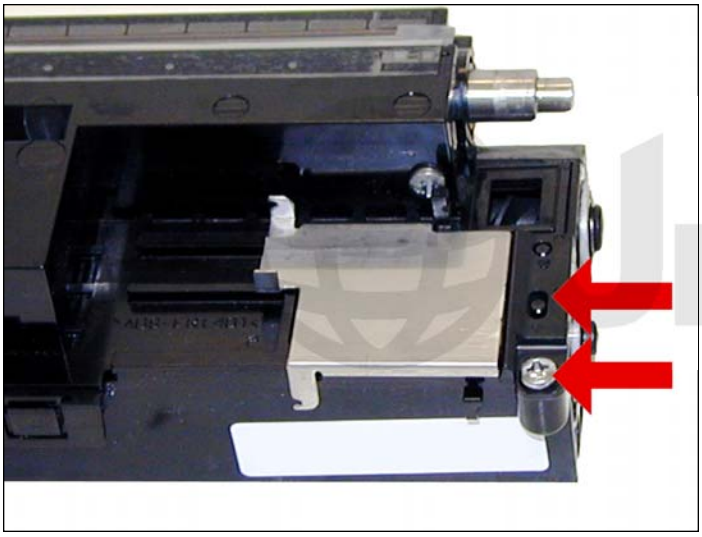


23. Snap the cover back in place.

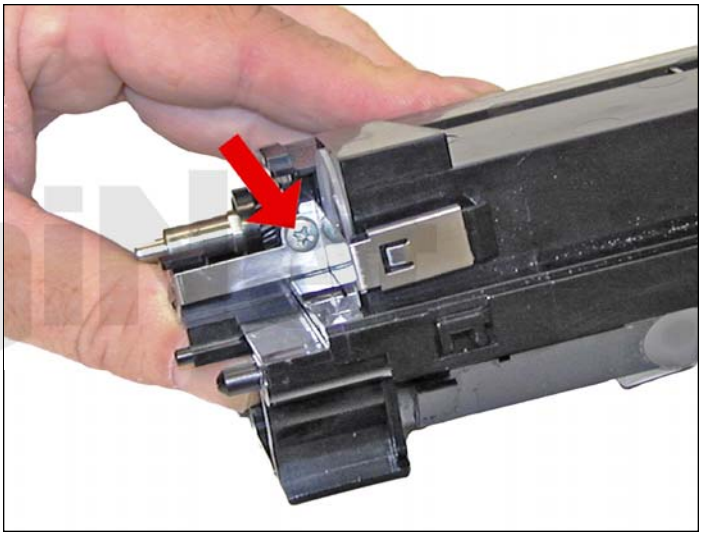
Make sure all three tabs lock!



24. Install the back screw in front of the metal cover.



25. Install the plastic spring arm and the screw to hold it in place (sliding the cover over allows the spring arm to fit correctly).



26. On the opposite side, install the screw into the metal contact.

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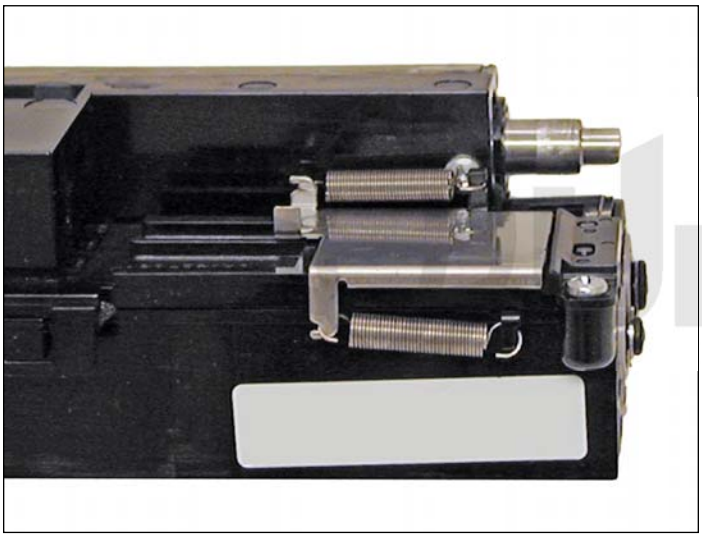
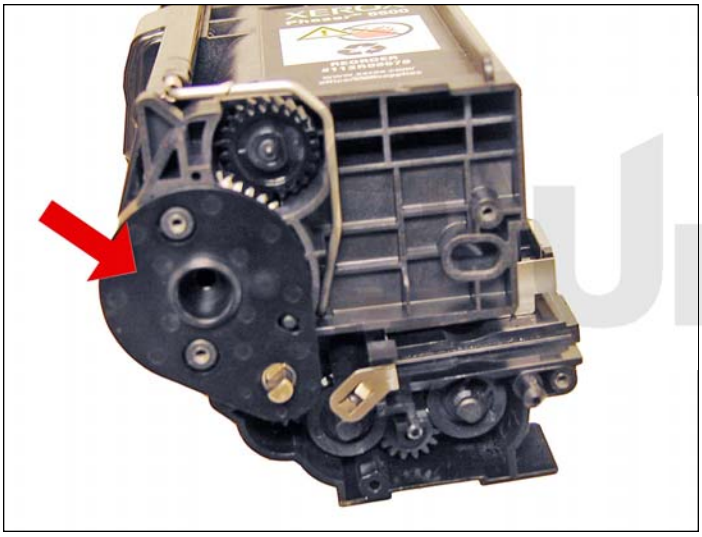
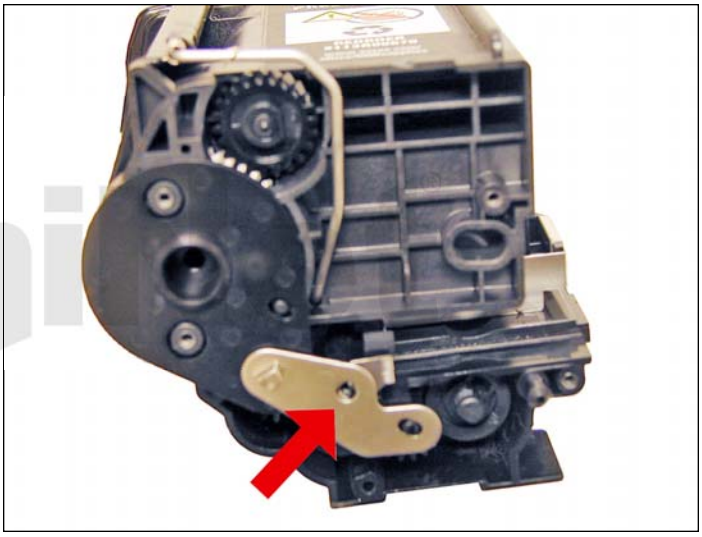


27. Install both springs on the metal cover.





28. While holding both halves together, install the drum bushings:

The pointed one to the gear side with the metal plate.

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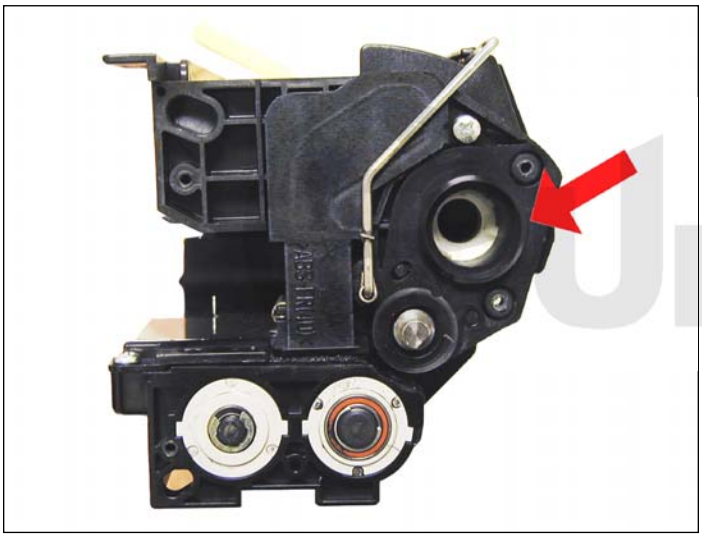
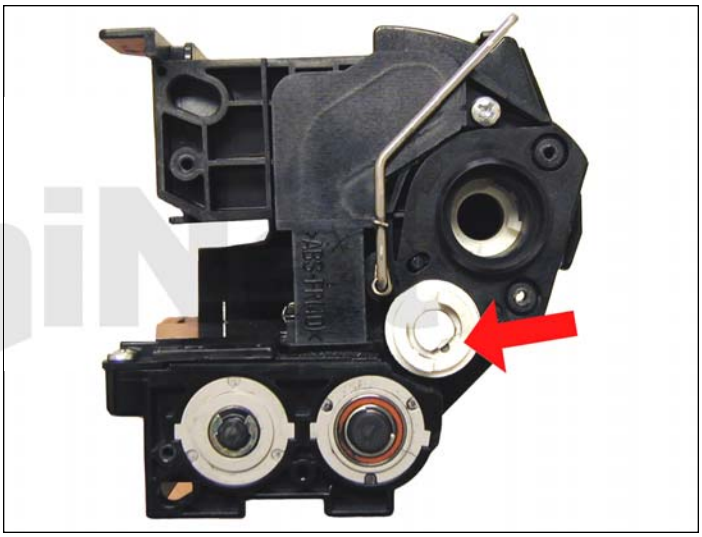
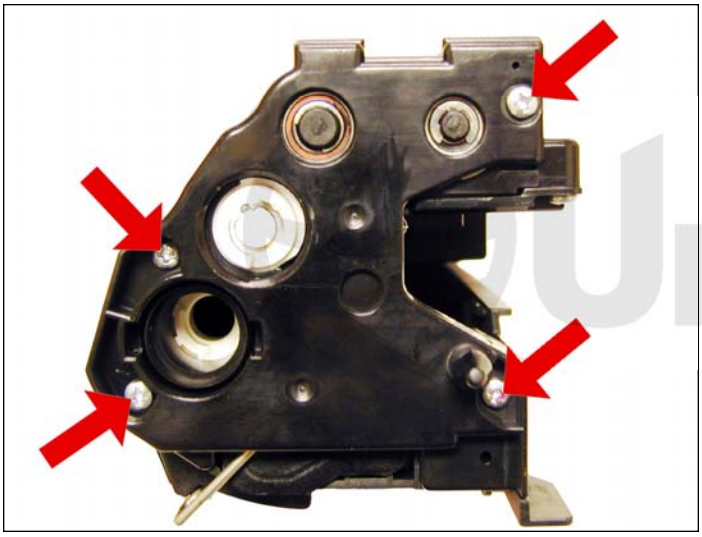




29. Install the double bushing to the non-gear side.

Also install the white gear onto the keyed shaft.



30. Install the end cap and four screws on the non gear side.

Make sure the white gear fits properly.

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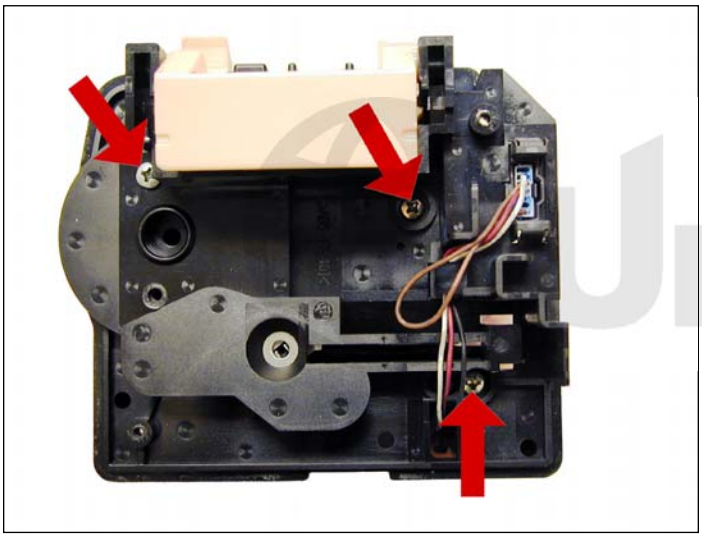
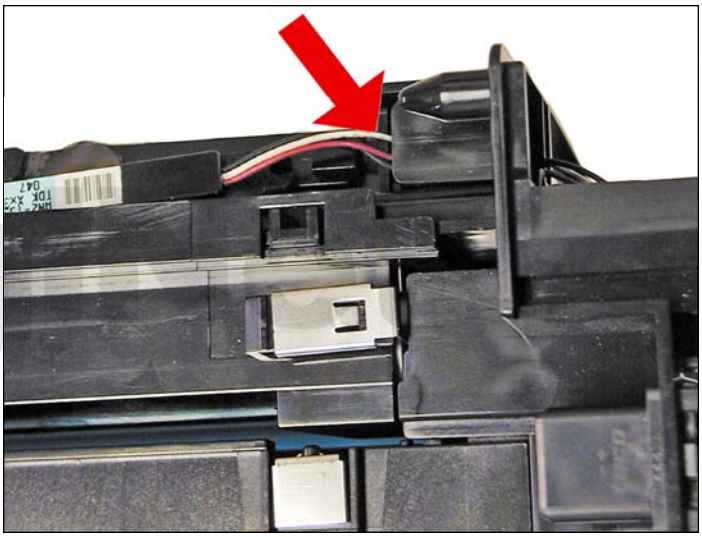
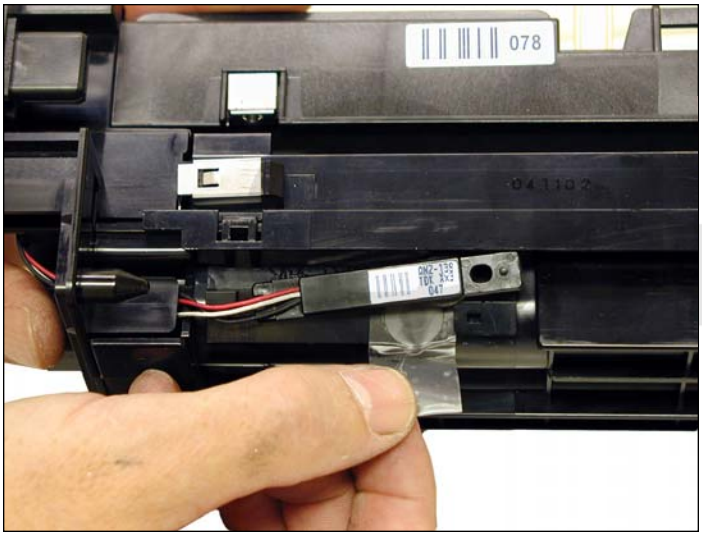
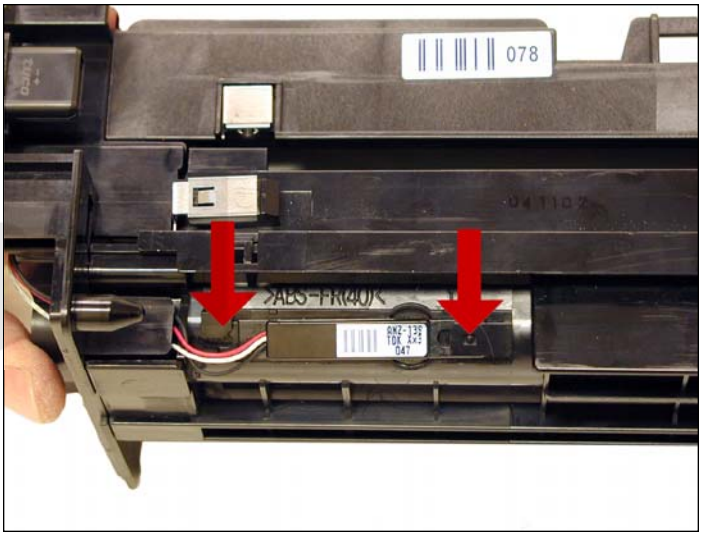




31. Install the inner handle end cap on the gear side, and the three screws.

Watch the wire routing so that they do not get pinched.





32. While holding the cartridge so the developer will not spill out, remove the tape from the sensor hole.

Make sure the wires are routed correctly and snap the sensor back in place.

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33. Install the outer end cap onto the gear side, and the two screws. Press down on the handle to allow the end cap to fit properly.

CARTRIDGE TROUBLESHOOTING

No real problems have been noted so far. The repetitive defect table is as follows:

Drum	**94.2mm**
Upper Fuser Roller	**78.5mm**
Transfer Roller	**58.7mm**
Developer Roller	**56.5mm**
PCR	**44.0mm**

MACHINE TROUBLESHOOTING

As with most machines these days, the error codes are in plain English and self explanatory.

There is no reason to go into them here.

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